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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/587,489

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Akira Fujiki

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EXAMINER

ORLANDO, MICHAEL N

ART UNIT

PAPER NUMBER

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/587,489	Applicant(s) FUJIKI ET AL.	
	Examiner MICHAEL N. ORLANDO	Art Unit 1791	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 January 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 8 and 10-14 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 8, 10-14 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

The examiner has fully considered the arguments and amendments submitted by the applicant on October 10, 2008, however, the merits of the claims remain unpatentable over the prior art.

Information Disclosure Statement

The listing of references in the specification is not a proper information disclosure statement. 37 CFR 1.98(b) requires a list of all patents, publications, or other information submitted for consideration by the Office, and MPEP § 609.04(a) states, "the list may not be incorporated into the specification but must be submitted in a separate paper." Therefore, unless the references have been cited by the examiner on form PTO-892, they have not been considered. The applicant lists references on page 1 of the instant specification that do not appear on the separately filed IDS.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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2. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 8 and 12-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suenaga et al. (US 2002/0051902 A1).

Regarding claim 8, Suenaga et al. teaches a polymer electrolyte fuel cell comprising separator plates layered on both sides of a membrane electrode assembly. The membrane assembly comprises an electrolyte membrane held by gas-diffusion electrode plates (i.e. gas diffusion layers) on either side. The separator plates of reference are further taught to contain grooved gas passages for either fuel gas passage, oxidizing gas passage or coolant flow, whereby the gas passages (grooves)

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are contacted with the gas diffusion electrode plates ([0004]). Suenaga et al. further teaches that sealing a separator plate is accomplished by the same methods as sealing gas-diffusion electrode plates to an electrolyte membrane (i.e. adhesive and hot press with dies) ([0018]-[0020]). It is recognized by the examiner that the adhesive taught by Suenaga et al. is not restricted to certain portions of the junction between the separator plate and the gas-diffusion electrode plates and therefore would include application at the partition walls among other locations. It is further recognized by the examiner that the terms jig and die are equivalents when taken in context.

Suenaga et al. discloses the claimed invention except for the pressure applied to the separators (the outermost component) resulting in the fuel cell becoming integral in a single step as opposed to such being accomplished in a two step process.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have created an integral fuel cell in one step, since it has been held that forming in one piece an article which has formerly been formed in two pieces and put together involves only routine skill in the art. *Howard v. Detroit Stove Works*, 150 U.S. 164 (1993). Unless applicant provides satisfactory evidence of a secondary consideration (unexpected results, commercial success, etc.) the mere combination of steps is taken as a matter of obviousness as set forth above and there is no teachings in the Suenga reference to suggest that the layers could not have been combined in a single process with a reasonable level of success in order to produce the obvious advantage of increasing manufacturing efficiency. Also, note that the courts have held

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that there merely needs to be a reasonable expectation of success and not an absolute predictability in order to justify a case of obviousness (Id. at 903, 7 USPQ2d at 1681).

Regarding claim 12, Suenaga et al. teaches the method of claim 8 as seen above. Furthermore, it is taught by Suenaga et al. that the seal may be formed from elastomers that require heating for vulcanization (i.e. thermosetting) ([0019]).

Regarding claim 13 and 14, Suenaga et al. teaches the method of claim 8 as seen above. Suenaga further teaches that the separator plates have a plural of gas passages ([0004]) and each of the gas passages (coolant, fuel gas, oxidizing gas) are sealed from one another. The coolant passage is further taught to be on the outer surface of the separator plate (i.e. the surface that would face the pressing dies) ([0006]). Suenaga et al. further teaches that the dies possess convex/concave portions to match the concave/convex portions of the article being pressed (figure 1E, reference number 40). It is recognized by the examiner that a "passage" taken in the context of the teachings would have been inherently defined by a concavity since coolant would not flow or be maintained by convex portions.

Suenaga et al. fails to explicitly teach that the pressing jigs (i.e. dies) have convex portions that compliment the inherent concavities of the separator plates.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the invention taught by Suenaga et al. to specifically utilize jigs (i.e. dies) that contain convex portions to match the concave portions (grooves) of the separator plates because it would have been realized that such a matching of convex/concave portions would have allowed for a more even compression, which

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would in turn would have been recognizably beneficial towards effecting a strong adhesion at all locations and such a complementation had already been taught by Suenaga et al. in the construction of the electrolyte assembly.

5. Claims 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Suenaga et al. (US 2002/0051902 A1) in view of Kohler et al. (US 2003/0224233 A1).

Regarding claim 10, the method of claim 8 is taught as seen above. Suenaga et al. further teaches that pressure and heat is applied to the separators by pressing jigs (referred by dies) and that such causes the fuel cell to become integral as is specifically discussed in claim 8 seen above.

Suenaga et al. fails to teach the utilization of catalyst layers as a coating applied to the membrane.

Kohler, drawn to a process of manufacturing fuel cells, discloses a common orientation in fuel cell production which includes coating the membrane with catalyst layer followed by the addition of Gas diffusion layers ([0005]-[0006]).

It would have been obvious to one having ordinary skill in the art to coat the membranes with a catalyst layer prior to the gas diffusion because such is a known manufacturing orientation in fuel cells and therefore combinable under the first prong of In re Woods (i.e. same field of endeavor). It would have also been obvious for an ordinary skilled artisan to utilize the coatings of Kohler because such were known for facilitating the oxidation of hydrogen and reduction of oxygen and therefore would be able to help drive the fuel cells energy production reactions ([0005]). The gas diffusion

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layers were also taught by Kohler as capable of bringing the reactive media (i.e. hydrogen and oxygen) to the catalytically active layers ([0006]).

Claims 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Suenaga et al. (US 2002/0051902 A1) and Kohler et al. (US 2003/0224233 A1), as applied to claim 10 above, and further in view of Debe et al. (US 2003/0041444 A1).

Regarding claim 11, the method of claim 10 is taught as seen above. Suenaga et al. further teaches that pressure and heat is applied to the separators by pressing jigs (referred by dies) and that such causes the fuel cell to become integral as is specifically discussed in claim 8 seen above.

Suenaga et al. fails to teach that through the use of an adhesive applied specifically in certain locations on the gas diffusion layer facing the catalyst layers, pressing jigs can be used against the separators on the outside to create an integral polymer electrolyte fuel cell.

Debe et al. teaches various methods of attachment for the gas diffusion layer (referred by electrode backing layers with gas transport properties) to the membrane, and moreover one which specifically utilizes a limited area adhesive attachment between the two ([0142]).

It would have also been obvious to one of ordinary skill in the art at the time of the invention to have modified the invention of Suenaga et al. to further include utilizing an adhesive in certain locations to secure the gas diffusion layers to the membrane in view of Debe et al. because such was known to avoid blocking all pores (i.e. better gas flow) ([0142]).

Response to Arguments

Applicant's arguments filed 01/27/2009 have been fully considered but they are not persuasive.

The applicant contends that the formation of an integrated fuel cell through a one-step process would not have been obvious in view of the knowledge in the prior art.

The examiner disagrees and notes that Suenga is provided to show that it is known to organize the stack in the same way as the applicant (i.e. a membrane layered with gas diffusion layers and separator plates), known to use adhesives between layers for connecting purposes and known to use heat/compression to adhere the layers by curing a thermosetting adhesive. The claims, given their broadest reasonable interpretation, merely require an adhesive used between layers, correct alignment (well-known) and a heated pressing means for sealing the parts (i.e. making integral). The examiner notes that Suenga provides that the claimed alignment was known ([0004] and [0016]) and provides that the hot pressing dies were used for the purposes of combining the layers (i.e. making integral as in [0016]). Also, the examiner notes that if an adhesive is connecting the layers it is either directly applied to a bonding surface or will be applied upon bringing it together with another bonding surface possessing the adhesive. As to forming in a single process rather than a step-wise process (as in Suenga) it would have been a matter of obviousness, since it has been held that forming in one piece an article which has formerly been formed in two pieces and put

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together involves only routine skill in the art. *Howard v. Detroit Stove Works*, 150 U.S. 164 (1893). Unless applicant provides satisfactory evidence of a secondary consideration (unexpected results, commercial success, etc.) the mere combination of steps is taken as a matter of obviousness as set forth above.

The applicant seems to contend that application of the adhesive to the partition walls as a means for connecting the separator plates and also argues that the inclusion of an adhesive for attaching the separator plate is a patentably distinguishing step.

The examiner disagrees and maintains the position above. As identified above and reiterated here, the arrangement of the particular claimed fuel cell is well known and set forth by the background of Suenga as is the pressing with dies to form the integral cell. Also, the use of adhesives for connecting the layers is known. In addition to the teachings and discussion of Suenga set forth above the examiner also notes a few other non-limiting examples to again show it was well known to attach separator plates with adhesives (US 2002/0114990; US 2003/0118889; US 6,080,503). These examples merely evidence the examiners position of obviousness above. As to the location of the adhesive on the partition walls it is discussed that adhesive bonding would have been an obvious choice for attaching the separator plate since adhesive were known for connecting the layers of fuel cells and in doing so clearly it would have been apparent to add adhesive to the contact zones between the two layers in order to facilitate bonding and not to the non-contact zones (i.e. the grooves that clearly do not directly contact the electrode plate) because not only would such not be a location defining a contact zone between the separator plate and electrode layer but adding adhesive to these passages

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would actually undermine the purpose of the feature which is to function as a grooved passage. The applicant is assuming that one of ordinary *skill* would not appreciate to add the adhesive to the bonding interface (i.e. the partition walls that directly contact the electrode layer) when adhesive bonding is desired. This argument presumes stupidity rather than skill because it is well known that adhesive bonding utilizes an adhesive to traverse a bonding interface and moreover because such presumes the destruction of Suenga's groove **passages**. In re Sovish, 226 USPQ 771, 774 (Fed. Cir. 1985) (emphasis in original).

In summary of the above mentioned it is clear that orientation of the fuel cell and use of adhesives for bonding the layers are known features. Absent a satisfactory showing of unexpected results that show evidence as to why combining the adhesion process into one step would not have been obvious the position as set forth above is maintained. As indicated above it has been well established that sequential processes and simultaneous processes are obvious over one another absent a showing to indicate otherwise. The combination of steps merely produces the expected result of increasing manufacturing efficiency because it is eliminating the time needed to perform multiple steps and consolidating it into one step.

The applicant also seems to argue that combining steps unexpectedly reduces process time.

It is common sense that combining steps would reduce process time since the time to perform each of the individual steps is consolidated into one process step and any argument to the contrary presumes stupidity rather than skill (In re Sovish, 226

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USPQ 771, 774 (Fed. Cir. 1985) (emphasis in original)). The argument that an ordinary skilled artisan would not have been able to comprehend that combining steps reduces process time is not found to be persuasive.

Conclusion

1. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to **MICHAEL N. ORLANDO** whose telephone number is (571)270-5038. The examiner can normally be reached on Monday-Friday, 7:30am-5:00pm, alternate Fridays.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Philip C. Tucker can be reached on (571) 272-1095. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

MO

/Philip C Tucker/
Supervisory Patent Examiner, Art Unit 1791